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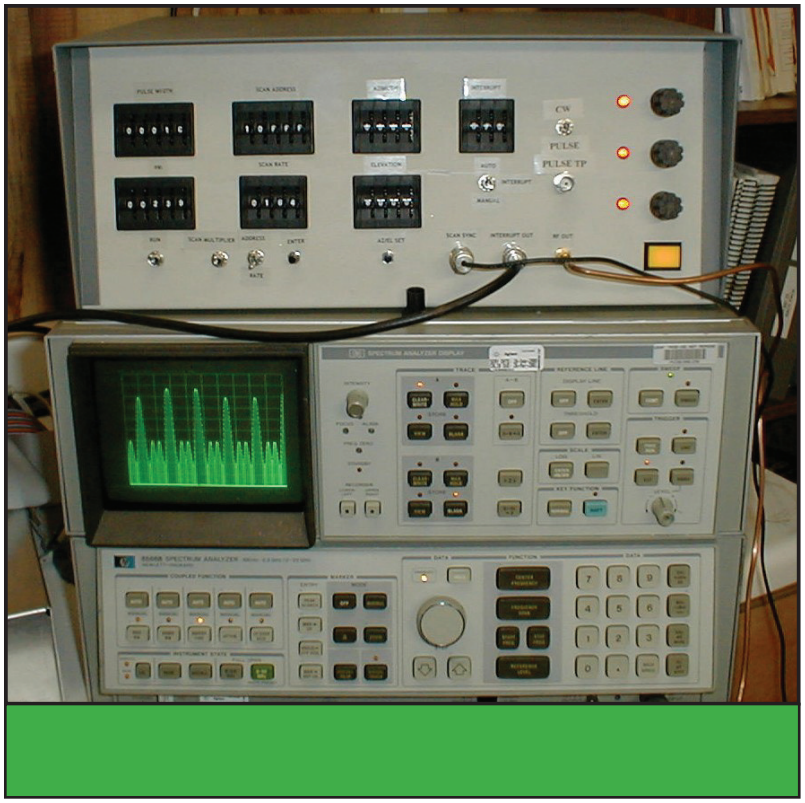
Success Story

DYNAMIC ANTENNA PATTERN GENERATION PROTOTYPE



The Sensors Directorate Integrated Demonstration and Applications Laboratory's (IDAL) new Dynamic Antenna Pattern Generation Prototype will enable radio frequency (RF) threat simulations to include emitter antenna pattern dynamics modeled on-the-fly. These RF threat simulations accurately represent antenna effects correlated with sensor platform dynamics. This will enable the directorate and future IDAL customers to continue sensor technology maturation in a controlled laboratory environment prior to entering flight test.

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Accomplishment

Directorate engineers, in conjunction with ITT Industries, Avionics Division, designed and built a Dynamic Antenna Pattern Generation Prototype. The prototype models the dynamics introduced by emitter antenna movement relative to changing sensor platform dynamics (e.g., aircraft maneuvers).

Directorate engineers used a specialized dual-port memory controlled by a complex programmable logic device and an embedded microprocessor to achieve programming flexibility and design goals. Engineers will use this intricate prototype to explore simulation algorithm and implementation alternatives necessary to satisfy the next generation simulation needs for precision targeting/location/identification systems. Examples of such systems include the directorate's Precision Location and Identification and Advanced Tactical Targeting Technology programs.

Background

The directorate developed RF-level simulation technology to support research and development, and technology insertion. As sensor technology changed and adapted to new and differing requirements, the IDAL successfully modified, extended, and developed new RF-level simulation technology and techniques. This ensures sensor technology matures in the laboratory prior to progressing to the flight test environment.

Directorate engineers successfully proved the methodology of risk mitigation through laboratory demonstrations over the years. Thus, the Department of Defense adopted this methodology as an essential tenet of the electronic combat test process.

Previous RF simulation architectures used static, target-centric antenna pattern generation methods sufficient for currently deployed sensors. New sensor designs, incorporating improved receiver sensitivity levels and increased signal analysis capabilities, will require far greater fidelity for generating accurate system-of-systems synthetic battlespaces.

The Dynamic Antenna Pattern Generation Prototype addresses the impact of sensor platform movement on simulating emitter antenna scan patterns. This unique design permits engineers to dynamically change simulated threat emitter patterns while eliminating pattern discontinuities normally associated with dynamic pattern rewrites. Directorate and future IDAL customers should benefit from reduced risk and costs associated with science and technology research programs and subsequent transition of sensor technology to the warfighter.

Sensors
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Additional information

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